



Department of Health and Environmental Sciences
STATE OF MONTANA HELENA, MONTANA 59601

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PLEASE RETURN

A. C. Knight, M.D., F.G.C.P.
Director

MEMORANDUM

TO: All Interested Parties
FROM: Michael D. Roach
SUBJECT: State Implementation Plan Revision
DATE: November 27, 1978

STATE DOCUMENTS COLLECTION

JAN 9 1979

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The enclosed document contains the narrative discussion of the proposed control strategies for several areas in Montana not meeting federal ambient air quality standards. The suggested strategies are designed to result in achieving the federal standards no later than December 31, 1982, as required by the 1977 Amendments to the Federal Clean Air Act.

The contents page identifies several appendices which include proposed rule revisions, background information, and analyses used in developing the control strategies. The full plans are available for inspection at the following locations.

Yellowstone County Air Pollution Control Office
3314 Second Avenue North, Billings, MT 59101

City-County Health Department, Air Pollution Control
1130 17th Avenue South, Great Falls, MT 59405

Air Quality Bureau, Department of Health and
Environmental Sciences, Cogswell Building,
Helena, Montana 59601

County Sanitarian, Custer County Courthouse,
Miles City, Montana 59301

Missoula County Health Department, Air Pollution Control
301 W. Alder, Missoula, MT 59801

A public hearing will be held on December 18, 1978, to receive comments on the planned revision. The hearing will begin at 8:30 a.m. in the basement of the Social and Rehabilitation Services Building, 111 N. Sanders, Helena.



Interested persons may present their data, views, or arguments, either orally or in writing, at the hearings, or may address their comments in writing to Michael Roach, Chief of the Air Quality Bureau, Department of Health and Environmental Sciences, Cogswell Building, Helena, Montana 59601. Written comments for the December, 1978 meeting must be submitted no later than December 17, 1978. Persons submitting written comments are requested to enclose at least two copies, and a copy for each of the seven members of the Board would be appreciated.

The entire plan or portions thereof are available upon payment of copying costs from the Air Quality Bureau. Enclosed is an order form indicating the various reports and their costs.



Mail requests for copies of any of the desired documents to:

Air Quality Bureau
Cogswell Building
Helena, MT 59601

Document	# of Pages	Cost each	# of Copies	Total
____ Proposed Rule Revisions	21	\$2.10	_____	_____
____ Adopted Rule Revisions	13	1.30	_____	_____
____ Butte Appendix	16	1.60	_____	_____
____ Columbia Falls Appendix	5	.50	_____	_____
____ PEDCo Analysis, Butte	46	4.60	_____	_____
____ PEDCo Microinventory & models - Columbia Falls, Great Falls, E. Helena	51	5.10	_____	_____
____ PEDCo Analysis - Missoula	25	2.50	_____	_____
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1 - Control Strategies

General

(1) The 1970 Clean Air Act resulted in promulgation of primary and secondary air quality standards that set strict limits on the amount of allowable air pollution. (Primary standards are intended to protect public health, secondary standards concern public welfare.) A number of areas in Montana were not meeting the standards and this year were designated "non-attainment" areas. The 1977 Amendments to that act require the State of Montana to draw up a plan for each of the non-attainment areas, outlining strategies for bringing those areas into compliance with the standard.

(2) The non-attainment areas in Montana are:

for carbon monoxide (CO): Billings, within the city limits

Missoula, within the city limits

for total suspended
particulate (TSP):

Billings, the downtown redevelopment area, bounded on the north by 6th Avenue North, on the east by 25th Street, on the South by 2nd Avenue South, on the west by 33rd Street/Division.

Butte area, bounded on the north by Townships 3-4N, on the east by I-15/US 91; on the south by I-90, 15/US 91; on the west by I-90, 15 Business Loop, Main Street and the city limits.

Colstrip area, bounded UTM coordinates 5091 KM (north), 383 KM (east), 5073 KM (south), and 365 KM (west) which include the mining areas.

Columbia Falls within the city limits.

East Helena, bounded on the north by Riggs Street, on the east by Montana Avenue, on the west by Harrison Avenue, and extending south past the BN tracks to form a rectangle on a small portion of the ASARCO smelter site.

Great Falls, bounded on the north by 2nd Avenue North, on the east by 10th Street North, on the south by 2nd Avenue South, with the western boundary about half way across the Missouri River.

Missoula, within the city limits.

For sulfur dioxide (SO₂)

Anaconda area, including the entire city and a large area south: Township 5 North, Range 12 West-Sections 35, 36; T5N, R11W-Sections 31-36; T5N, R10W-Sections 31-33; T4N, R12W-Section 1, 2, 11-14, 23-26, 35, 36; T4N, R11W-Sections 1-36; T4N, R10W-Sections 508, 17-20, 29-31; T3N, R12W - Sections 1, 2, 11, 12; T3N, R11W-Sections 1-12; T3N, R10W - Sections 5-8.

East Helena, a circle with a 0.67 kilometer radius around the ASARCO smelter.

Laurel, a circle with a 2 kilometer radius around the Cenex Refinery.

For Oxidant (O_x)

Yellowstone County.

(3) A most widely-applicable and effective administrative tool for achieving air quality standards, especially in non-attainment areas, is a new permit rule (ARM 16-2.14(1)-S14) proposed for adoption by the Montana Board of Health and Environmental Sciences.

With several exceptions, the permit rule states that "no person shall construct, install, alter or use any air contaminant source or stack associated with any source without first obtaining a permit from the Department or the Board."

The rule applies to existing pollution sources, which would be required to apply for operating permits under the new rule even if permits earlier had been granted by the Board or Department, as well as to modifications to existing operations and new pollution sources.

The rule also would require construction permits for new sources and alterations or modifications of existing sources.

Permits for construction or alteration of sources shall be valid for two years from the date of issuance. Permits for operation shall be valid until revoked or modified to reflect changes in rules or standards adopted by the Board, or changed conditions of operation that would increase emissions.

The Department could grant permits for construction and operation of sources only if it is demonstrated that the source can be expected to operate in compliance with the federal and state pollution regulations. The Board or Department may also include any stipulations it believes necessary in the permit. Permits may be revoked for violation of state or federal air pollution regulations, or for violation of stipulations in the permit.

Exempted from the permit requirements are:

- a. residential and commercial fuel burning equipment;
- b. residential and commercial fireplaces, barbeques and similar devices for recreational cooking or heating;
- c. motor vehicles, trains, aircraft and other such self-propelled vehicles;
- d. laboratory equipment used exclusively for chemical or physical analysis;
- e. food service establishments;
- f. any activity or equipment associated with the use of agricultural land or the planting, production, harvesting or storage of agricultural crops. (The exclusion does not apply to the processing of agricultural products by commercial businesses.);
- g. ventilating systems used in buildings to house animals;
- h. emergency equipment installed in hospitals or other public institutions or buildings for use when usual sources of heat, power and lighting are temporarily unobtainable;

- i. any activity or equipment associated with the construction, maintenance, alteration or use of roads, except for stationary sources, including but not limited to rock crushers and asphalt plants, and roads associated with a source that is otherwise required to obtain a permit under the rule;
- j. agricultural and forest slash burning activities (this exclusion does not exempt such activities from regulation under the Open Burning Rule, ARM 16-2.14(1)-S14 99);
- k. all other sources and stacks not specifically excluded which have the potential to emit less than 10 tons per year of any pollutant for which a rule has been adopted in this subchapter of regulations;

Of the above exclusions, (a) fuel burning equipment, (b) fireplaces, (c) motor vehicles, (f) agricultural activity and (j) slash burning might be considered, at least collectively, as significant and perhaps chronic sources of air contaminants. Their exclusions forces alternative strategies to be considered for areas violating standards where the pollutants emitted by the excluded sources need control. Those alternative strategies will be discussed in the individual non-attainment plans under the specific pollutant involved (fireplaces under Missoula's Total Suspended Particulate Plan; Motor Vehicles under the carbon monoxide plans for Missoula, Billings, and Great Falls).

Fireplaces, automobiles and fuel burners are excluded because individually they are insignificant polluters and would not need pre-construction or pre-operation review.

Agriculture is excluded for a number of economic, social and scientific reasons.

Agriculture is Montana's primary industry. It brings in more money than any other single industry and dictates the lifestyle and character of the state, which state leaders, including the governor, repeatedly have stressed must be preserved. It is, in a sense, a grandfathered area.

Agricultural operations emit large amounts of particulate matter (dust), but the vast majority of particles are large, probably greater than 20 to 30 microns in diameter, and settle quickly in the area of the source. The dust particle size associated with health problems is in the neighborhood of 2 microns or less. Also, agriculturally emitted dust is surface material, and as such does not contain concentrated elements of such hazardous air pollutants as arsenic and lead.

Agricultural operations also emit some nitrogen oxides, and hydrocarbons through the use of diesel machinery, but these are not present in sufficient numbers in a small enough area to constitute a health threat.

Slash burning is excluded because that activity is controlled by the state open burning rule, which restricts such burning to clean dry material during periods of good ventilation.

The proposed permit rule requires the owner or operator of a new or altered source to apply for a construction permit at least 180 days before

construction is to begin. Permit applications for new or modified source operation must be submitted at least 120 days before construction is scheduled to end. Owners or operators of existing, unaltered sources would have until January 1, 1981, to apply for an operating permit.

Decisions on construction permits will be made after opportunity for public comments and hearings. Operating permits will not require a public hearing if it is demonstrated that the source was constructed in compliance with its construction permit, if any; that the source can comply with applicable air quality rules and standards, and, for existing sources, the source has operated with the conditions of an existing permit. In any case, operating permit applications must undergo public review if it is demonstrated that new information or changed conditions would significantly affect the operation of the source or affect its compliance with applicable rules or standards.

Under the rule, applications for construction permits must include a detailed description of the location and salient physical features of the source or alteration, estimates of production capacity and types of material to be used in production, a description of pollution control devices, and methods of disposal, normal and maximum operating schedules, the nature and types of emissions and their impact on air quality, and other information requested by the department.

However, the rule does not require submission of information already filed with the department.

Permits may be granted to sources unable to meet air quality standards as long as those standards are achieved within two years after the permit is issued.

The owners or operators of all new or modified sources are required to install the best available pollution control equipment, and operate that equipment to provide the maximum air pollution control for which it was designed.

The new rule would require new and modified sources proposing to locate in non-attainment areas to comply with the requirements of Section 173 of the Clean Air Act Amendments of 1977 that the source achieve the lowest achievable emission rate.

Other rules concerning Montana's control of air pollution are:

ARM 16-2.14(1)-S1410	Emission Level Limitations
-S1420	Incinerators
-S1430	Particulate Matter, Industrial Processes
-S1440	Particulate Matter, Airborne
-S1450	Particulate Matter, Fuel Burning Equipment
-S1460	Visible Air Contaminants, Restrictions
-S1470(1), (3)	Sulfur Oxide Emissions
-S1480	Control of Odors
-S1490	Open Burning Restrictions
-S14000	Malfunction of an Installation
-S14010	Circumvention
-S14020	Motor Vehicles Control of Pollution
-S14030	Wood Waste Burners

- SI4050 Testing Required, Facilities
- SI4060 Fluoride Emissions, Restrictions
- SI4070 Petroleum Products, Existing Storage
- SI4080 Aluminum Plants, Fluoride and Particulate Restrictions
- SI4082 Standard of Performance for New Stationary Sources

1.1 CO

1.1.A - Billings

(1) Violations of the standard that sets a maximum on average carbon monoxide concentrations at 9 parts per million in any 8-hour period resulted in non-attainment designation for Billings.

(2) The 1977 Emission Inventory by the Yellowstone County Air Pollution Control Board indicates that the vast majority of CO emissions are from cars and trucks.

Table A 1.1-1
1977 Emission Inventory

<u>Source</u>	<u>Tons Per Year</u>
Light duty gas powered vehicles	3,030.0
Railroads	5.0
Natural Gas	9.4
Total	3,044.4

An analysis performed by PEDCo Environmental based on 1975 data indicates that 97,566 tons of CO per year are emitted in the Billings area. The Yellowstone County Air Pollution Control Agency estimates that 3,399 tons were from sources in the non-attainment area. The maximum 8-hour average measured in the downtown area was 13.1 ppm in 1975. Therefore, it can be inferred that if 3,999 tons per year yield a maximum 8-hour reading of 13.1 ppm, then in order to achieve a 9 ppm concentration, emissions must be reduced to 2,345 tons. This represents a 31 percent reduction.

PEDCo determined that the 8-hour National Ambient Air Quality Standard (NAAQS) for CO is being violated at three locations: The Central Business District, the Grand Avenue - 6th Avenue North intersection and the Exposition Drive-First Avenue North Intersection. PEDCo also determined that the CBD and the Grand-6th Intersection will not be in violation of CO standards by 1982 because of the increasing percentage of vehicles equipped with catalytic converters.

Table A 1.1-2
Predicted Carbon Monoxide Emissions

<u>Location</u>	<u>8-hour concentrations (ppm)</u>		
	<u>1975</u>	<u>1982</u>	<u>1985</u>
CBD	18.0	No violation	No violation
Grand Ave./6th Ave. No.	11.3	No violation	No violation
Exposition Dr./1st Ave. N.	14.9	11	9.4

Therefore, the Billings-Yellowstone City-County Planning Board, designated as the lead agency for air quality planning in the Billings Urban area by the Governor of Montana, has focused its CO control strategy on the Exposition-First Intersection.

(3) A project is currently scheduled in the Annual Element of the Transportation Improvement Program to widen Exposition, and redesign and add traffic signals to the intersection with First Avenue North.

(4) PEDCo predicts that implementation of the above measures would lower CO concentrations at the intersection only to 9.6 ppm by 1982--still slightly above the federal standard. PEDCo predicts that, by 1985, it will be reduced to 7.2 ppm.

The Planning Board and members of the Technical Advisory Committee believe the 9.6 figure is higher than will be achieved because data, methodology and assumed intersection design provided to PEDCo have since been found to be inappropriate.

A microscale dispersion model, HIWAY, was used to predict CO concentrations. This model contains several variables, among which are traffic volumes and travel speeds. At the time of the PEDCo analysis, limited data was available concerning these two key variables. The major work emphasis was then being directed toward the development of a long range transportation plan. Since that time more accurate traffic projections and speed data has become available.

At the time the PEDCo analysis took place emission factors based on standards were considered to be valid. Emission factors using a computer program called Mobile I have since been developed based on revised new car emission standards. These factors will be incorporated into the analysis along with the other changes that must be made to improve the accuracy of the air quality modeling.

The Yellowstone County Air Pollution Control Board and Billings-Yellowstone City-County Planning Department believed the HIWAY model was not adequately calibrated and tended to give inflated figures.

Also, the initial analysis at the Exposition Drive/First Avenue North intersection assumed a free flow lane for the Lockwood to Billings Heights movement. The Technical Advisory Committee (TAC) recommends that additional free flow lanes be incorporated if possible into the design. Indications are that the project can be redesigned to achieve still greater travel speeds.

Time did not permit for a detailed computer analysis of the concept due to previous commitments and priorities by PEDCo Environmental. However, TAC feels justified in assuming that such improvements would be sufficient to achieve attainment due to the anticipated speed increases.

Indications are that the proposed control measures will be sufficient to attain the air quality standard, and that this conclusion can be substantiated by reanalysis of the situation using revised input data. This more detailed analysis will be completed before the end of the 1978-79 fiscal year.

(5) The project to widen Exposition Drive and to signalize the intersection with First Avenue North is contained in the annual element of the Transportation Improvement Program. Preliminary engineering is scheduled to be completed in 1979 with project completion scheduled for September 1980.

The Montana Action Plan which describes how a project is carried through to completion is currently being reviewed to determine whether the process can be simplified. This may result in a shorter implementation period for scheduled projects. Regardless of the outcome of this review, every effort will be made to avoid delays in implementation.

(6) The reconstruction and signalization project proposed as a means of attaining the carbon monoxide standard comes directly out of the recently approved Transportation Plan. This project represents the most reasonable approach to ensuring the attainment of the 8-hour standard given the relatively short amount of time available to do so.

Other more long-range transportation improvements are also directed at improving air quality. Projects that reduce traffic on congested or high volume roadway facilities are in fact a major part of the adopted plan. To the extent that the plan can divert traffic away from the Highway 87/Exposition Drive corridor, there will be a beneficial effect on air quality.

Air quality criteria was used in the plan development phase of the process to help evaluate transportation alternatives. Based on an analysis of the social, economic and environmental effects of alternate transportation systems, a final plan was selected.

The social and economic effects of the proposed strategies for controlling total suspended particulates have not been considered but are obviously minimal.

The Environmental Protection Agency provided the states a list of nineteen potential measures to reduce carbon monoxide emissions. An initial screening process quickly eliminated many of the control measures. A detailed computer analysis eliminated others from consideration. Discarded items from list and reasons for rejecting them are found in Table A 1.1-3.

Table A 1.1.3.

Potential CO Control Measures

<u>Control Measure</u>	<u>Justification for not Adopting</u>
Improved public transit	Legal problems, routing would cross political jurisdictions
Areawide carpool programs	Cost ineffective based on analysis of expected emissions reduction
Inspection/Maintenance	Politically infeasible
Vapor recovery	Economically infeasible
Exclusive bus and carpool lanes	Small transit fleet, cost ineffective
Private car restrictions	Public acceptance unlikely
Long range transit improvements	Improvements could not be implemented before 1982
On street parking controls	Problem area already prohibits parking
Park and ride and fringe parking lots	Limited by small transit fleet
Pedestrian malls	Not applicable
Bicycle lanes and storage facilities	Not applicable for location of predicted violation
Staggered work hours	Politically infeasible, cost ineffective

Table A 1.1-3 Cont.

<u>Control Measure</u>	<u>Justification for not Adopting</u>
Road pricing to discourage single occupancy auto trips	Public acceptance unlikely
Controls on extended vehicle idling	Enforcement limitations
Alternate fuel or engines and other fleet vehicle controls	Economically infeasible
Other than light duty vehicle retrofit	Economically infeasible
Extreme cold start emission reduction programs	Economically infeasible

(7) The U. S. Department of Transportation (DOT) and Environmental Protection Agency (EPA) have issued joint regulations requiring a commitment to maintaining and implementing the SIP. This commitment has in part been shown during the past year by the development of this plan. Other planning activities have been identified in the Prospectus to firmly establish air quality as an important consideration in the transportation planning process. Future manpower and financial commitments to planning, contained in future annual work programs, will also have the benefit of both EPA and DOT review to ensure compliance with federal regulations.

Commitment to implement control measures has also been demonstrated by the obligation of funds for the design of the reconstruction and signalization project at Exposition Drive and First Avenue North. Future SIP's will continue to show a financial commitment to this project and progress toward implementation.

1.1.B - Missoula

(1) Missoula was designated a non-attainment area after sampling revealed violations of carbon monoxide standards. Less than a year's data showed 55 violations of the eight-hour average standard of nine parts per million CO in the air, with a maximum eight-hour average of 13.87 ppm.

(2) The main source of CO in Missoula is vehicle emissions.

(3) However, the staff and members of the Missoula County Air Pollution Control Board, which is the lead agency in the county for the State Implementation Plan, believe the CO problem has been overstated somewhat because of the failure of traffic control systems. All the monitoring at the major intersection of Highway 93, Russell and South was conducted without the intersection loops working. The loops, which are under the paved surface of the road, count the number of vehicles using the road and adjusts the timing of traffic lights accordingly. Some 14 loops will have to be repaired.

The Division also is considering rerouting Highway 93 onto Reserve Street, which runs above one and one-half miles west of the current highway route down Brooks Street, and which links with the southern section of Highway 93 south of the South-Russell-93 intersection. Such a rerouting would take a significant traffic burden off of the current route as it passes through the city.

(4) The full implementation plan revision prepared by the Missoula Agency is available in the Division offices in Missoula.

1.2 TSP

General:

(1) Basic to control of total suspended particulate matter (TSP) in several non-attainment areas is proposed new airborne particulate rule, also known as the fugitive dust rule. It is proposed to replace the current airborne particulate rule (ARM 16-12.14 (1)-S1440), which is not specific and simply requires control of airborne particulate in storing, handling and transporting material, and application of "all . . . reasonable measures" for dust control in construction.

The proposed rule sets a specific emission limitation on many activities, and specific limitations on roads and streets, and open-pit and strip mines in non-attainment areas.

The proposed rule would require that persons involved in production, handling, transportation or storage of material, or in a construction or demolition project, take reasonable precautions to control emission of airborne particulate matter. In any case, such emissions are not to exceed an opacity of 20 percent.

The rule also would set strict emission limitations on paved, and unpaved roads in areas designated non-attainment for TSP. Allowable emissions for every vehicle mile traveled are highest for unpaved roads and lowest for paved roads, with allowable missions per vehicle mile traveled decreasing as traffic volume increases.

The rule establishes the following formula for allowable emissions (in pounds per VMT) for unpaved roads:

$$\text{TSP} = 2 - \frac{1.6 \times 10^{-3} (\text{ADT or EADT})}{E = 4.5e}$$

where: E = emission factor

ADT = average daily trips

EADT = estimated average daily trips

Thus, an unpaved road with an average traffic volume of 100 trips per day would be allowed to emit 3.835 pounds of particulate matter for every mile a vehicle traveled down it. Assuming that 100 vehicles passed over the road in one day, one mile of the road would be allowed to emit 383.5 pounds of particulate in that day (100 trips X 3.835 pounds per trip per mile).

If an unpaved road had 1900 trips per day average, the maximum emission rate would be 0.909 pounds/VMT for total emissions per mile of roadway at 909 pounds per day, assuming that 1,000 cars actually traveled down the roadway that day.

In the above instance, an increase in the average traffic volume by 10 times would result in an allowable emissions increase of less than two and one-half times.

The restrictions on paved streets are much more severe, with the allowable emissions factor determined by the formula:

$$3 = 0.19e^{-2.1 + 10^{-4} (\text{ADT or EADT})}$$

On paved roads, the allowable emission rate would be 0.186 lb./VMT with 100 ADT, 0.154 for 1,000 ADT, 0.023 for 10,000 ADT, etc.

The emission factor for unpaved roads where dust is being controlled by water is:

$$\text{EFc} = \frac{(\text{EF}) (100 - x)}{100}$$

where: E_{fc} = the actual emission factor for an unpaved road by water.

EF = the actual emission factor for an applicable unpaved road in an unwatered condition.

x = the percent of emissions control obtained by the watering program.

Thus, the emission factor for unpaved roads controlled by watering is reduced by the effectiveness of the watering program in controlling emissions. If watering reduced emissions by 50 percent, then the emission factor would be half the emission factor for unwatered, unpaved roads of the same traffic volume.

If a preliminary study by the Department implies that certain roads or streets in a TSP non-attainment area are in violation of the above standards, the rule would allow the Department to require whomever has jurisdiction over those roads or streets to perform traffic counts on them. The Department's preliminary analysis could include, among other things, air monitoring data, public complaints or preliminary emission factor calculations. But in any case, the preliminary analysis must be based on the best available information.

TSP non-attainment designation also would activate a provision in the rule that requires that the best available control technology be applied for controlling particulate emissions from new and existing slag heaps, strip mines or open pit mines.

Billings TSP

1.2 A Billings

(1) The Billings downtown was designated a non-attainment area based on marginal violations of the secondary standard that sets a limit on the average concentration of total suspended particulate in the air at 150 micrograms per cubic meter, with only one violation allowed per year. Billings recorded a second highest reading of 151 ug/m^3 .

(2) The 1977 Emission Inventory by the Yellowstone County Air Pollution Control Board, showed that the single largest source of TSP emissions in the area was paved roads.

Table 1.2 A-1

Total Suspended Particulates 1977 Emission Inventory¹

<u>Source</u>	<u>Tons per Year</u>
Construction	1.2
Vehicles	17.1
Railroads	3.0
Paved Roads	38.8
Misc.	6.0
Total	66.1

PEDCo Environmental, the Department's consultant, has predicted that without controls TSP concentrations in the Billings central business district will read a yearly average concentration of 70 ug/m^3 in 1980, while the federal secondary guidelines is set at 60 ug/m^3 .

Table 1.2 A-2

Predicted Total Suspended Particulate Concentrations

	<u>Annual Geometric Mean (ug/m^3)</u>		
<u>Location</u>	<u>1974</u>	<u>1980</u>	<u>1985</u>
CBD	60	70	73

(3) Because the problem is caused for the most part by the reentrainment of dust by motor vehicles, the City of Billings is proposing to initiate the use of vacuum sweepers in the street cleaning program. Vacuum sweepers should be more efficient than the conventional broom sweepers. Street flushing will also be performed more frequently, and streets in the downtown area will be cleaned as soon after sanding operation have been completed as possible. The State Department of Highways will also discontinue the use of cinders to de-ice North 27th Street.

(4) PEDCo Environmental indicates that the effects of the above strategies

cannot be reliably determined. Research on the subject is quite limited and documentation is scarce. Therefore, a pilot program involving these strategies will be established and monitored to determine the results.

(5) Commitment to implement the TSP control strategy is demonstrated by the fact that the City of Billings made the financial commitment to purchase new vacuum sweeping equipment, which it has recently received.

A program to combine the use of these sweepers with other proposed control measures will begin in January 1, 1979. Procedures for monitoring the results of the program will be worked out in advance of that date.

(6) Because of the nature of the problem, strategies in addition to this were limited to street cleaning and de-icing operation.

(7) The social and economic effects of the proposed strategies for controlling total suspended particulates have not been considered but are obviously minimal.

1.2 B-Butte

(1) The northeast section of Butte, including the Berkely Pit area, was designated for non-attainment of the secondary standard that sets a maximum on the average concentration of total suspended particulate in the air during any 24-hour period at 150 micrograms per cubic meter. By the end of 1977, TSP concentrations at the Greely School monitoring site had increased to 78.7 $\mu\text{g}/\text{m}^3$, and resulted in the redesignation of the area to non-attainment for the primary standard of 75 $\mu\text{g}/\text{m}^3$. A calibrated computer model completed during November 1978 shows the average concentration at Greely School at 81.5 $\mu\text{g}/\text{m}^3$.

(2) 1977 data shows that TSP emissions from point sources (specific, individual polluters whose emissions stem from a localized point) were insignificant when compared with total emissions from area sources, such as roads and the Berkeley Pit. Total 1977 point sources emissions were listed at 323 tons of TSP, while the most recent data available sets area source TSP emissions at 5,608 tons per year.

Table 1.2 B-1

Source	Area Source TSP Emissions Tons per year
Fuel combustion	54.8
Mobile sources	
Motor vehicle exhaust	57.5
Off-highway	1.5
Railroads	2.0
Fugitive dust	
Unpaved roads	817.4
Clean Paved streets	288.4
Dirty paved streets	105.6
Cleared areas	14.7
Construction	32.4
Railroad yards	9.5
Aggregate storage	1.4
Other	
Burning	198.4
Subtotal	1585.0
Berkeley Pit	4023.0
Total	5608.0

(3) The control strategy proposed for the Butte TSP non-attainment area consists of enforcement of the new permit rule and the airborne particulate rule, discussed at length above. The airborne particulate rule will be the primary control mechanism, with the permit rule providing additional enforcement capability.

The airborne particulate rule will be enforced on haul roads and haul trucks in the Berkeley Pit operations, and paved and unpaved city streets.

(4) Application of both rules will drop TSP concentrations at the Greeley School site to an estimated 69.8 ug/m^3 and bring the area into compliance with the primary standard.

Table 1.2 B-2

Source TSP Contribution at the Greeley School

Source	ug/m^3 current	ug/m^3 after controls
Background	20.2	20.2
All Point Sources	.4	.4
Area Sources	60.9	49.2
Breakdown of area sources		
Fuel combustion	2.0	2.0
Clean paved streets	7.0	8.0
Dirty paved streets	9.0	
Auto Exhaust	1.7	1.7
Unpaved Roads	1.3	1.1
Burning	8.2	8.2
Berkeley Pit	30.6	27.1
All Others	<u>1.1</u>	<u>1.1</u>
Total calibrated geometric mean	81.52	69.8

(5) It is anticipated, that the lag time involved in initiating road and street sampling programs will result in slow progress during the first six months of 1979. However, it is also known that the recent move by the Anaconda Company to convert from 100 Ton haul trucks to 150 and 170 ton trucks will reduce haul road and tail pipe emissions. A recently instituted diesel engine testing and tuning program shall also have some immediate effects on air quality. In addition, several extremely dirty streets in the area of the Greeley School have recently been paved. These actions should have the effect of taking up the slack during the first six months of the plan.

During the time period extending from June 30, 1979 to June 30, 1980, it is anticipated that rescheduling and better use of existing equipment (street sweepers, watering trucks, etc.) should provide for reasonable further progress.

After June 30, 1980, until December 31, 1982, any necessary reconstruction, construction or equipment purchase will slowly be accomplished and will begin to affect emissions. These additional controls will bring the Butte area into compliance with Primary national ambient air quality standards.

It is also believed that using these early years as an example will provide a clearer definition of possible control measure leading to reasonable further progress toward secondary standards.

1.2.C - Colstrip

(1) Colstrip was designated non-attainment for the primary standard that sets a maximum on the average yearly concentration of total suspended particulate in the air at 75 micrograms per cubic meter with only one 24-hour average allowed to exceed 260 micrograms per cubic meter. Company data showed the annual mean TSP concentration in Colstrip at 107 $\mu\text{g}/\text{m}^3$; the highest reading was 428 $\mu\text{g}/\text{m}^3$.

(2) PEDCo Enviromental has determined that the largest source of TSP in the area is the coal strip mining operation upwind for Colstrip. The largest non-mining source is fugitive dust, mainly from the unpaved streets and secondarily from construction activities.

COLSTRIP NON-ATTAINMENT AREA
PARTICULATE EMISSIONS BY SOURCE
CATEGORY FOR 1974 AND PREDICTIONS FOR 1980 IF
NO CONTROLS ARE USED. (TONS/YEAR)

SOURCE CATEGORY	1974	1980
Fuel Combustion	8	19
Open Burning	negligible	negligible
Highway Vehicles	2	5
Off Highway Vehicles	3	7
Railroad	negligible	negligible
Unpaved Roads	1065	1257
Paved Roads	25	57
Agriculture	25	15
Construction	770	negligible
Western Energy		
Area A	422	2140
Area B	-	2140
Area E	-	2039
Pit 6	1261	-
Peabody	860	1348
Total Mining	2543	7667
Total Non-Mining	1892	1360
Total	4435	9027

Source: PEDCo, Southeastern Mt. Coal Resource AQMA Analysis, March 1977.

COLSTRIP NON-ATTAINMENT AREA
COAL MINE PARTICULATE EMISSIONS BY SPECIFIC
MINING ACTIVITY AND MINING AREA FOR 1974 AND
PREDICTIONS FOR 1980 IF NO CONTROLS ARE USED

	WESTERN ENERGY						ACTIVITY TOTAL	
	Area A		Area B		Area E		Pit 6	
	1974	1980	1974	1980	1974	1980	1974	1980
Coal Removal	20	122	122		108		60	50
Overburden							100	130
Removal	142	839	839		741		294	588
Scraper Activity	35	104	104		104		35	70
Haul Roads	45	271	271		298		83	166
Vehicle Exhaust	31	69	69		69		31	69
Storage	22	132	132		116		neg.	neg.
Wind Erosion	54	540	540		540		194	292
Blasting	73	73	73		73		73	73
Area Total	422	2140	2140		2039		1261	860
							1348	2543
								7667

Source: PEDCo, Southeastern Mt. Coal Resource AQMA Analysis, March 1977.

However, another consultant, Midwest Research Institute (MRI), in a report for Montana Power Company, showed some emission data for small areas near the sampler. For just three categories of area sources within one mile of the sampler, the table below shows the MRI emission estimate.

Source Categories	1976 Emission (tons/year)
Paved roadways	43
Unpaved roadways	398
Bare area wind erosion	2364
Total	2805

PEDCo estimated total emissions for the same area (one mile radius) at 1982 tons/year.

(3) Control strategies to be applied to coal mining emissions offer the best potential for attaining the standard. Using PEDCo data for 1980, the following reductions are possible: covering coal stockpiles, 100 percent efficiency, 380 TPY reductions; stabilization of active mining open areas, 80 percent efficiency, 1530 TPY reductions; haul road speed control and dust suppression, 50 percent efficiency, 503 TPY reduction. MRI estimates that road watering gives an efficiency of 34-43 percent and 80 percent for re-vegetation of open areas.

(4) The Department believes that attainment of the standard can best be demonstrated by enforcing the proposed airborne particulate rule through the permit rule and subsequent ambient air monitoring.

Attempts by several groups, including EPA, to develop computer models to relate mine emissions to ambient air quality have been rather unsuccessful. Difficulties in determining emission rates and behavior, in the air, of the emitted particulates are prime among the causes. Thus, there is no method available to demonstrate that the standards will be attained.

The new permit rule, which would comply with federal regulations for issuing permits in several areas, would require the mining companies to apply for a Department operating permit by January 1, 1981. The new permit rules would give the department more flexibility in imposing conditions for further operation. Such conditions could include the emission standards set in the proposed fugitive dust rule, thereby tying the companies' further mining to compliance with the rule.

The new permit system also would handle federal Clean Air Act provisions for non-attainment plans. Under the act, a new major polluting source or modification of an existing source may be issued a permit and allowed to operate only if other major sources in the area comply or are scheduled to comply with federal emissions standards; the new source will comply with the lowest achievable emission rate; and total emissions in the area would show a significant drop even with the addition of the new source.

(5) Alternate strategies for reducing TSP would include strict enforcement of the fugitive dust rule particularly regarding the streets and alleys in Colstrip. Frequent cleaning of the paved street, and paving and cleaning of the unpaved streets, watering or chemical treatment of the alleys, and strictly enforced speed limits on unpaved roads would reduce the fugitive dust emissions.

1.2.D - Columbia Falls

(1) Columbia Falls was designated non-attainment for the primary standard that sets a maximum on the average yearly concentration of total suspended particulate in the air at 75 micrograms per cubic meter. In 1977, the annual average was 82.8 ug/m³.

(2) PEDCo Environmental has determined that the largest source of TSP in the area is by fugitive dust, primarily from unpaved streets and dirty paved streets.

Table D 2.2-1

Area Source Category	Emissions (Tons per Year)
Combustion	15.1
Industrial processes	13.0
Fugitive Dust	453.0
Total	481.1

Table D 2.2-2

Fugitive Dust Source	Emissions (Tons per Year)*
Railroad yards	2.3
Clean streets	Negligible
Dirty paved streets	111.7
Unpaved roads	316.8
Cleared Areas	0.6
Construction	6.6
Agriculture	Negligible
Storage areas	12.8
Unpaved parking lots	2.2

(3) The area can be brought into compliance with federal standards by frequent cleaning of Nucleus Avenue, which is the busiest street in Columbia Falls and the largest single source of TSP.

(4) The cleaning of Nucleus would eliminate the often seen visible dust plume from traffic, which accounts for 18.6 ug/m³ of the TSP concentration in the area. Elimination of the plume would drop the annual average TSP concentration in the area to 64.2 ug/m³, well within the federal primary standard.

(5) The State Highway Department plans to let contracts to rebuild Nucleus Avenue and Highway 40 through Columbia Falls in May, 1979. The projects, which will take about one year to complete, will include curbs and gutters, enabling the streets to be cleaned adequately.

*The contribution from unpaved roads is actually higher than listed in Table D 2.2-2. The artificially low number listed in the table was the result of a mislocation by PEDCo of an area source - Superior Building - on PEDCo's grid system for Columbia Falls. The error does not affect the numbers listed in Table D 2.2-1 on area source categories. For an explanation of the error, see Appendix for 1.2.D, item 2.

The city has purchased a new street sweeper, which would adequately clean Nucleus. Cleaning of the street could be required under a new airborne particulate rule, discussed at length under the 1.2 TSP heading above.

It will be necessary to frequently clean Nucleus after it is rebuilt because of dirt and mud carried onto it from adjacent unpaved streets.

(6) A number of alternative strategies were investigated and rejected. These strategies called for:

a. Cleaning all presently paved streets. This strategy, which does not include the improvements made to Nucleus Avenue mentioned in the adopted₃ strategy, would lower annual average TSP concentrations by only 5.8 ug/m³ at the very most--not enough to meet the federal standard.

The Highway Department cleaned Nucleus and Highway 40 only twice a year with an old, worn out sweeper. Columbia Falls bought its own sweeper in the spring of 1978; but in order to obtain the full 5.8 ug/m³ reduction, and to adequately clean all streets, curbs and gutters would have to be added to many streets. Also, the pavement of those streets would have to be in good shape.

The cost of upgrading the pavement and adding curbs and gutters is relatively expensive to justify the relatively low reduction in emissions that exclusive application of this strategy would provide.

b. Paving and cleaning all currently unpaved streets. This would bring a TSP reduction of 20.0 ug/m³. Few of the streets in Columbia Falls are paved, making this strategy very expensive. City residents recently have voted down a number of paving SID's and the high cost of this strategy definitely would limit its acceptability.

c. Paving all unpaved streets and cleaning all streets. A combination of strategies a + b above, this strategy would reduce emissions by a maximum of 25.8 ug/m³. Like the above two strategies, it was rejected because of the high cost.

d. Reducing industry emissions to zero. This strategy affords a minute 1.9 ug/m³ drop in TSP concentrations and would entail enormous cost for so little benefit.

1.2.E - East Helena

In March of 1978 one area within East Helena, Montana was declared as non-attainment for Total Suspended Particulate. As required, an inventory of all sources of particulate within a one-mile radius of the Pacific Street monitor was undertaken. PEDCo Environmental was contracted to develop a micro-inventory for all sources of pollution in and around the non-attainment area.

The results of that inventory indicate that of the area TSP contribution, 50.6 percent is contributed by construction activities which have since ceased. Industrial contributions to the area source concentration of 26 ug/m^3 is approximately 1.7 percent. Applying these percentage reductions for construction to the high TSP reading of 1977 (66.7 ug/m^3) which is the most recent data, would result in a concentration of $66.7 - 13.4 = \underline{53.3 \text{ ug/m}^3}$ on an annual basis.

The construction activities actually began in the early fall of 1976 and proceeded through 1977, with final construction completed in 1978.

This reduction alone will bring the non-attainment area into compliance with national ambient air quality standards (NAAQS) since it reduces the annual concentration below the 60 ug/m^3 guideline.

However, to be certain that TSP standards are not exceeded, ASARCO shall proceed with their attainment plan, which is outlined below.

ASARCO has agreed to take steps consistent with Montana airborne particulate rule, discussed at length above, to reduce TSP emissions from slag piles at its East Helena smelter. ASARCO has agreed to "spray the piles with water or other coating material periodically as needed to minimize airborne particulate matter."

1.2.G - Missoula

(1) Missoula was designated a non-attainment area after sampling showed an annual mean of 77.4 micrograms of TSP per cubic meter of air, while the primary standard limit is 75 ug/m³. Data also showed six violations of the 24-hour federal standard, which allows only one violation per year.

(2) The main source of Missoula's air pollution problems for TSP is traffic-related, stemming from emissions from the surfaces vehicles drive over.

(3) The Missoula County Air Pollution Control Board, which is the lead agency in the county for the State Implementation Plan, has adopted regulations intended to cut down dust emissions from streets, parking lots and other sources. Under the regulations, the county Air Pollution Control Division will make recommendations to political subdivisions within the county by January 1 of each year on control measures for publicly-owned roads or parking areas that are used by more than 50 vehicles per day over any three-day period. The political subdivisions are to submit a plan and progress report to the division by May 1 of each year. Also under the regulations, the Division can require paving of all parking areas, and access and egress, owned or operated by commercial establishments off of public roads that are used by more than an average of 200 vehicles per day over any three-day period. The regulations also require owners or managers of private property containing a road or thoroughfare used by more than 50 vehicles per day over a three-day period to submit control plans providing for paving or restricting traffic to paved areas. The plans must include a schedule for paving surfaces or restricting access, to be completed within a year after the plan is submitted. (Privately owned land in areas that do not violate TSP standards and which are used seasonally and intermittently are exempt from the regulation.)

The regulations also require that reasonable measures be taken to limit the amount of TSP resulting from construction of buildings, roads or other things, and from transport or storage or handling of material that may cause controllable particulate emissions.

The Missoula City Council has passed an ordinance to require persons in various areas to all park on one side of the street during alternate time periods to allow street sweepers access to all sections of roadway.

The Division is asking the State Highway Department to purchase another street sweeper. The State Highway Department owns all major thoroughfares passing through Missoula. However, that Department currently has only one sweeper available to serve all of western Montana.

The Division also is negotiating with the Technical Advisory Commission for paving of shoulders and access control along certain state routes.

The Division also proposes to push for paving SID's in certain county problem areas in the high-density urban area.

The Local Board also is asking persons not to use fireplaces 10 to 15 days a year during periods of air stagnation.

The Division also hopes to study and evaluate different types of sanding material, such as salt. The county currently uses relatively soft sand and small gravel, which is ground to powder by vehicle tires.

(4) Social impacts to the area for the proposals would include inconvenience in parking.

Economic impacts would include added cost to any persons, company or agency required to restrict access or pave surfaces, and the cost of 60 to 70 percent of the SID's to persons with property on affected streets.

(5) The full implementation plan revision prepared by the Missoula Agency is available in the Division offices in Missoula.

1.3.A - Anaconda

The SIP for Anaconda was approved November 16, 1978, by the Board of Health and Environmental Sciences, and will be submitted for approval by the Governor. Therefore it has not been included in this document.

1.3.B - East Helena

(1) East Helena was designated a non-attainment area after monitoring indicated violations of primary sulfur dioxide standards in the immediate vicinity of the ASARCO smelter.

(2) Modeling showed average 24-hour concentrations of SO_2 up to 0.26 parts per million in the area's air. The primary standard sets the 24-hour maximum average at 0.14 ppm, with only one violation allowed per year.

Currently, the main source of SO_2 emissions are weak, variable-strength gases from the sinter plant and the three short stacks associated with the blast furnace baghouse.

(3) SO_2 emissions now are being controlled by a sulfuric acid plant and stacks on the sinter plant, the zinc fuming plant and the acid plant. Construction of a 375-foot stack on the smelter's blast furnace baghouse, replacing the three smaller stacks already there, will complete the SO_2 control strategy.

(4) ASARCO has agreed to limit emissions of sulfur dioxide from the new stack to 23 tons per day (never to be exceeded) and 5.6 tons an hour. Modeling by the department indicates that these emission levels will bring the area into compliance. The demonstration of attainment was achieved through use of the CRSTER model.

(5) Under an agreement between ASARCO and the Department, and adopted by the Board, the following compliance plan is adopted:

Within three months after approval of the construction of the new 375 foot stack, including the final approval and adoption of such control strategy by the State of Montana, the U. S. Environmental Protection Agency and any other governmental agency from which approval must be obtained, including issuance of a construction permit by the State of Montana as applicable, ASARCO shall complete engineering plans for construction of the new 375 foot stack for the blast furnace baghouses;

Within three months of completion of engineering plans, ASARCO shall let contracts and issue purchase orders for equipment for construction of the stack;

Within three months after completion of the contract and issuance of purchase orders, ASARCO shall commence on-site construction of the stack;

Within fifteen months after commencement of on-site construction, ASARCO shall complete construction, installation, start-up and shake-down operations on all equipment and facilities associated therewith;

If EPA or other necessary governmental agency approval occurs later than July 1, 1979, the compliance schedule set forth above will be delayed accordingly on a month-by-month basis, provided, however, that in no event shall final compliance take place later than December 31, 1982;

It is understood that the above-mentioned compliance schedule represents the maximum time schedule for completion of each step in the process. Should any step be completed earlier than the time provided for in the above schedule, the time period for the next step in the process shall commence as of the date of completion of the previous step, and the final compliance date will be accelerated accordingly, provided, however, that the starting date for the first increment of progress shall be no sooner than July 1, 1979.

Assuming construction approval by July 1, 1979 and completion of steps in the maximum time allowed under the agreement, the compliance schedule would be as depicted in Table B 1.3-1.

Table B 1.3-1

<u>Step</u>	<u>Compliance Date</u>
A	10/1/79
B	12/31/79
C	3/31/80
D	6/30/81

If ASARCO anticipates any delay in completing any of the aforesaid steps, it shall notify the Department immediately of that fact and the reasons therefor. Such notification shall not constitute an excuse for such delay, subject to the provisions of paragraph 12 below. It is understood that violations of this Stipulation may result in enforcement action against ASARCO by the Department under the terms of the Montana Clean Air Act (69.3904 et. seq., R.C.M. 1947) and the Federal Clean Air Act.

ASARCO shall file with the Chief of the Air Quality Bureau written quarterly progress reports with respect to the foregoing compliance schedules. The reports shall include such drawings, computations and other documentation as are reasonably necessary for an analysis of the progress being made.

The Department and ASARCO agree that so long as ASARCO continues in good faith to pursue construction in accordance with the above schedule, ambient air quality levels attributable to low-level emissions from the existing blast furnace baghouse stacks shall not be the basis for any proceeding against ASARCO, except that, if ASARCO fails to achieve substantial compliance with any of the above increments of progress by the final date prescribed therefor, it may be subject to penalty (to the State of Montana only) under Title 69, Chapter 39 of the Revised Code of Montana for excursions above any enforceable Montana ambient air quality standard for SO₂ caused by low-level emissions during the period commencing when ASARCO fails to meet such compliance schedule increment of progress and ending as of the date on which ASARCO completes compliance with the applicable step in the compliance schedule. For purposes of determining when violations under this section are considered to be caused by low-level emissions, it shall be assumed that violations of applicable SO₂ ambient air quality standards at the Kennedy Park Monitor Station in East Helena are caused by low-level emissions. Excursions above ambient air quality standards at the Kleffner Road, Kleffner Ranch, East, North and Water Tower Monitor Stations are assumed not to have been caused by low-level emissions. In the event such

excursions occur at those latter five monitor stations, ASARCO may demonstrate to the Department, upon proper showing of pertinent meteorological or other data, that those excursions were in fact caused by low-level emissions. If ASARCO attains final compliance prior to the final date contemplated herein (June 30, 1981 or such other date necessitated by events as described in paragraphs 7.E and F above), no enforcement action shall be taken nor shall any penalties be assessed with respect to any excursions attributable to low-level emissions.

In the event there is a recorded SO_2 concentration in excess of federal SO_2 ambient air quality standards, ASARCO shall report such event to the Chief of the Air Quality Bureau as soon as reasonably possible after ASARCO has knowledge thereof.

Notwithstanding any statutory provision to the contrary, all of the above provisions are subject to "force majeure" as to any and all causes beyond the control of ASARCO. Upon the happening of any such event, ASARCO shall report the same to the Chief as soon as is reasonably practicable.

It is understood that completion of the above-mentioned control strategy is dependent on continued operation of the ASARCO lead-zinc smelter complex. If at any time ASARCO decides for any reason to permanently shut down its smelter, it may discontinue all efforts to comply with the above schedule and the provisions of this Stipulation without penalty, and ASARCO may continue to operate the smelter complex without further compliance with this Stipulation, until the final date for shutdown of the smelter. The length of time during which ASARCO may so operate the smelter complex without compliance with this Stipulation shall be limited to the time frame, as approved by the Department, as may be reasonably necessary to complete arrangements for cessation of operations. If at any time prior to cessation of operations, ASARCO should change its decision and decide to continue operations at the smelter complex, ASARCO shall notify the Department immediately, and the provisions of this Stipulation shall again be fully operative and continue forward to its full completion, provided that any delay caused by this decision to shut down shall not constitute an excuse for not meeting the final compliance date under this Stipulation. If ASARCO wishes to modify the dates for this compliance schedule as a result of a reconsidered decision to shut down, it shall petition the Board of Health and Environmental Sciences to so modify those dates.

Also under the agreement, ASARCO must supply the Department with periodic data to indicate that it (ASARCO) is complying with the terms of the agreement.

The Department and ASARCO agree that the stipulation in no way supersedes any other stipulations or agreements entered into by ASARCO and the Department that pertains to construction of SO_2 control facilities at the East Helena smelter complex.

In addition to the above stipulation, ASARCO and the Department are conducting a study to determine whether the SO_2 control by the acid plant (which removes SO_2 from sinter plant off-gases) is sufficient to protect the health and welfare of area residents. The study is to be completed in February 1979.

1.2.F - Great Falls

(1) Sampling of TSP concentrations by the City County Air Pollution control resulted in designation of a small portion of downtown Great Falls as non-attainment. In 1976 the annual geometric mean (AGM) was 74.2 ug/m^3 with 6 values above the secondary standard (150 ug/m^3). In 1977, the AGM was 52.4 , but there were 5 readings above 150 ug/m^3 .

(2) A preliminary analysis relating particulate emissions and TSP ambient concentrations done by a consultant to the Department (PEDCO Environmental) shows that slightly over half (56 percent) of TSP in 1977 was background. The point sources (basically industrial facilities) accounted for only 0.2 percent of the TSP at the station. The remainder is area sources, the major component of which is traffic.

Review of the data shows all the violations in 1976 and 1977 except one occurred between October and April. In 1978 to date there have been no violations of the 24 hour standard. While not absolutely conclusive, the data and analysis corroborates the contention that the problem is related to winter sanding and dust resulting from sanding material remaining on the bare dry streets after snow melt. Table F 1.2-1 lists a summary of the 1977 emission in an area within one mile of the sampler.

Table F 1.2-1

<u>Category</u>	<u>Particulate Emission (tons/year)</u>
Combustion	
Residential	4.4
Commercial Industrial	14.0
Incinerator	1.6
Railroad/aircraft	0.4
Auto exhaust	42.3
Fugitive Dust	
Railroad yards	16.5
Clean streets	224.5
Commercial streets	88.7
Unpaved roads/alleys	91.2
Cleared areas	4.1
Construction	84.1
Unpaved parking lots	2.6
Total	574.4

The full analysis is found in Appendix

(3) The solution to the problem would seem to be reducing fugitive dust emissions from the paved streets in the area. The fact that the annual averages in 1977 and so far in 1978 are below federal guidelines of 60 ug/m^3 strongly indicates that solutions should address short-term problems. Normally, if the AGM is less than 60, no 24-hour violations should occur. The impacts of dust from First Avenue South and 9th Street are the logical target for emission

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reduction. It currently appears that a program should be developed to maintain the conditions found in 1978 when no violations were recorded. A trial program of street sweeping and/or flushing reduce street dirt loading should accomplish this objective. The program should focus on the streets previously mentioned, with provision to expand if necessary.

The second highest TSP values were 177 ug/m^3 in 1976 and 195 ug/m^3 in 1977. Achieving the standard of 150 can be accomplished without much difficulty.

(4) Alternatives to the proposed solution would include reduction of vehicle traffic in the area, paving unpaved roads and parking lots, and regulating construction practices in areas to limit fugitive dust emissions. These alternatives, however, would have minimal impact on the air quality. Reducing paved road emissions by 20 percent would lower the AGM by 2.5 ug/m^3 whereas eliminating of all construction-related dust would result in a decrease of only 0.8 ug/m^3 . The alternatives do provide the potential for additional reduction should the proposed solution not achieve the desired results.

(5) The non air quality impacts of the proposed solutions appear minimal. In any event, they would be less than those associated with the alternative. Changes in winter sanding practices and subsequent clean up could result in increased manpower and material costs, although not necessarily. Conceivably, changes in sweeping scheduling could accomplish the desired result without sacrificing any other changes.